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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

March 26, 1993

In Reply Refer to: 3HW21

Ms. Tamara C. Royer, Project Coordinator
Ruetgers-Nease
201 Struble Road
State College, PA 16801

Re: Centre County Kepone Site

Dear Ms. Royer:

We have completed our review of the Final Remedial Investigation Report (RI) dated December 23, 1992 for the referenced project. We have also completed an evaluation of the recommendations regarding kepone presented by Weinberg Consulting Group, Inc. in their letters dated December 2 and 8, 1992, to the IRIS Information Submission Desk. We are also in receipt of the Final Report of the Spring Creek Sediment Testing Program dated March 9, 1993.

The purpose of this letter is to forward the review comments provided by members of the EPA project team. The comments from the Pennsylvania Department of Environmental Resources (PADER) are also enclosed in whole.

The majority of EPA's comments are focused on whether or not original draft RI comments submitted by EPA on September 15, 1992 have been addressed. These are formatted as a comment by comment evaluation. EPA's December 31, 1992 comments on the Initial Preliminary Identification of Potential Applicable or Relevant and Appropriate Requirements (ARARs) and Remedial Action Objectives (RAOs) Report were also considered during our review to ensure consistency between the RI and Feasibility Study (FS). In addition, separate comments that do not fit into the format descibed above are also presented. Due to the significance of some of the comments, and the exclusion of important portions of the text, the RI must be revised to address the remaining concerns of EPA and PADER prior to being considered a final document. Nevertheless, the RI provides sufficient information to allow for implementation of the site's FS. Consequently, the RI is approved as acceptable for the purpose of initiating the FS and the date of your receipt of this letter serves as the starting date for the FS schedule.

In regards to the results of our evaluation of Weinberg's recommendations, EPA agrees with the proposed LOAEL of 6.5×10^{-1} mg/kg/d. Applying uncertainty factors of 10 (interspecies), 10 (intraspecies), and 10 (LOAEL to NOAEL) to the LOAEL, we calculated an RFD of 6.5×10^{-4} mg/kg/d, as also proposed by Weinberg.

We do not, however, agree with the recommendation that the compound be reclassified from a B_2 to a C carcinogen. The weight-of-evidence supports kepone being considered a known animal carcinogen (B_2). That having been said, however, we agree with Weinberg that available evidence does not support the calculation of a carcinogenic potency slope.

Based on this review, for the purpose of this site's Risk Assessment, kepone must be assessed as a non-carcinogen only, with a reference dose of 6.5×10^{-4}. Its status as a B_2 carcinogen without a potency slope must be acknowledged in the uncertainty section.

Finally, we are still evaluating the results of the Final Report of the Spring Creek Sediment Testing Program dated March 9, 1993. Consequently we have not commented on the interim sediment toxicity test reports provided with the RI. Our comments on the final toxicity test report will be forthcoming under separate cover pending the completion of our review.

We request that an electronic copy of the final RI compatible to WordPerfect 5.1 be submitted with the revised RI. Please feel free to contact me at (215) 597-8309 if you have any questions or wish to discuss the enclosed comments.

Sincerely,

David G. Byro

David G. Byro, Project Manager
S.E. Pennsylvania Remedial Section

Enclosure

cc: Bill March, SMC
Randolph S. White, Golder Associates
Doug Overdorf, PADER
Tad Yancheski, Tetra Tech Inc.
Howard Greenberg, Esq., Ruetgers-Nease

EPA REVIEW COMMENTS SUMMARY - FINAL RI REPORT
CENTRE COUNTY KEPONE SITE

	COMMENT ADDRESSED	COMMENT PARTIALLY ADDRESSED	COMMENT NOT ADDRESSED
SECTION 1 - INTRODUCTION			
1.		X	
2.		X	
3.	X		
4.		X	
5.		X	
6.	X		
SECTION 2 - STUDY AREA INVESTIGATION			
1.			X
2.		X	
3.		X	
4.	X		
5.	X		
6.	X		
7.	X		
8.	X		
9.		X	
SECTION 3 - PHYSICAL CHARACTERISTICS OF THE STUDY AREA			
1.		X	
2.			X
3.		X	
4.		X	
5.		X	
6.		X	
7.		X	
8.	X		
9.			X
10.	X		
11.	X		
12.	X		
SECTION 4 - NATURE AND EXTENT OF CONTAMINATION			
1.	X		
2a.			X
2b.		X	
3.		X	

EPA REVIEW COMMENTS SUMMARY (cont'd.)
CENTRE COUNTY KEPONE SITE

	COMMENT ADDRESSED	COMMENT PARTIALLY ADDRESSED	COMMENT NOT ADDRESSED
4.			X
5.	X		
6.			X
7.			X
8.			X
9.			X
10.	X		
11.		X	
12.		X	
13.	X		
14.	X		
15.	X		
16.			X
SECTION 5 - CONTAMINANT FATE AND TRANSPORT			
1.			X
2.	X		
3.	X		
4.	X		
5.		X	
6.			
SECTION 6 - BASELINE RISK ASSESSMENT			
Human Health Risk Assessment			
1.		X	
2.		X	
3.			X
4.	X		
5.	X		
6.		X	
7.		X	
8.	X		
9.	X		
10.	X		
11.	X		
12.	X		
13.	X		

EPA REVIEW COMMENTS SUMMARY (cont'd.)
CENTRE COUNTY KEPONE SITE

	COMMENT ADDRESSED	COMMENT PARTIALLY ADDRESSED	COMMENT NOT ADDRESSED
14.	X		
15.	X		
16.	X		
17.	X		
18.	X		
19.	X		
20.	X		
21.	X		
22.	X		
23.	X		
24.	X		
25.	X		
26.	X		
27.	X		
28.	X		
29.	X		
30.			X
Ecological Risk Assessment			
1.	X		
2.		X	
3.		X	
4.		X	
SECTION 7 - SUMMARY AND CONCLUSIONS			
1.		X	
2.			X
3.			X
4.	X		
5.	X		
6.		X	
7.	X		
8.	X		
9.	X		

CENTRE COUNTY KEPONE SITE
FINAL RI REPORT REVIEW
(BASED ON RESPONSE TO EPA'S SEPTEMBER 15, 1992 COMMENTS)

SECTION 1 - INTRODUCTION

General Comments

1. A summary of major historical study "conclusions" should be considered for inclusion in the RI report, given the relevance of the historical conclusions, and the perception of the public regarding the historical information. Conclusions of interest may include:

   - Conclusions regarding kepone/mirex contamination in residential wells located west and northwest of the site;
   - Conclusions regarding kepone/mirex contamination at the UAJA site, Cramer Spring, and other downstream areas (Bald Eagle Creek, Blanchard Reservoir);
   - Conclusions regarding the kepone/mirex analytical problems noted in various studies;
   - Conclusions regarding the presence (or absence) of semi-volatile and inorganic contamination at the site;
   - Conclusions regarding prior remedial actions completed at the site, etc.

   This summary could provide the rationale as to why areas of concern were studied or not in the current RI.

RESPONSE: Comment partially addressed - The final RI document will include a historical data and conclusions section (Section 1.2.7), although this section is not yet completed. Therefore, the effectiveness of the revised document meeting the comment can not be fully evaluated.

2. A summary of historical semi-volatile, PCB, pesticide, and inorganic data should be considered for inclusion in this section or section 4. Sample locations and results would be useful in documenting why these compounds were not extensively investigated during the recent RI. This will make the RI report more complete and comprehensive.

RESPONSE: Comment partially addressed - This information is to be included in Section 1.2.7, if it is to be provided. A summary of this information could be provided on a site map depicting locations of samples (per analyses, for example, i.e. a location map showing where samples were collected for semi-volatile compound analysis, PCB analysis, etc.) and results, if any.

3. It is not clear why the ground-water monitoring data collected in conjunction with the existing pump and treat system was not included in the RI report. This information may be useful in the FS in establishing the effectiveness of ongoing pump and treat activities and would aid in remedial design.

RESPONSE: Comment addressed

Specific Comments

4. p. 1-7 -- The discussion of organic raw materials, intermediates and products should be expanded; especially for the contaminants of concern. Waste streams should also be described.

RESPONSE: Comment partially addressed - Although there is some description about raw materials, intermediates, products and waste streams, the description is very brief and does not account for the present condition of the site. The description of the waste streams should include a discussion of disposal practices.

5. p. 1-11 -- It is stated that kepone and mirex were detected in Bald Eagle Creek. If this is indeed correct, the presentation and further evaluation of this information should be considered for inclusion in this RI report, given that the downstream extent of kepone/mirex has not been established in this RI report.

RESPONSE: Comment partially addressed - The revised document adequately addresses the detection of kepone and mirex in fish present in Bald Eagle Creek, however, there does not appear to be any additional information presented regarding the extent of kepone and mirex in surface water or sediment in Bald Eagle Creek. This information should be discussed in the historical summary section. A conclusion should be made somewhere in the RI report as to the known and projected downstream extent of kepone and mirex contamination in the 1) surface water; 2) sediment; and 3) fish.

6. p. 1-12 and 1-13 -- It is stated that mirex and kepone were detected in Cramer Spring and residential wells along Trout Run Road, however it is further stated that this detection is considered suspect DeLeon (1980). Given that this is an extremely important point, additional description and evaluation of the historical residential well and spring data from this area should be considered. The current document leads the reader to believe that Cramer Spring and Trout Run Road residential wells were (are?) contaminated with kepone and mirex.

RESPONSE: Comment addressed

SECTION 2 - STUDY AREA INVESTIGATION

Specific Comments -

1. p. 2-60 -- With regard to the off-site well survey, additional investigation in this area should be considered. An obvious data gap remains since no information could be obtained for eight of the fourteen wells surveyed. Additional efforts to investigate these wells should be considered.

   The discovery that the Pederson well at 2377 Struble Road is still in use for water supply may be a concern. The water level measurement collected from this well should be evaluated with regard to the water levels at the site to determine if this point is "upgradient" or "downgradient" of the site. In addition, the water supply source for the homes located along First Avenue, Jalice Circle, and Struble Road should be confirmed.

RESPONSE: Comment NOT addressed - The revised document does not appear to address this comment. Although table 2-4 has been updated to include additional information for residential wells, the update reveals that there are numerous wells being used for water supply along Struble Road (wells 13, 21, 22, 23, and 29). In addition, the table does not indicate if water level measurements were attempted at wells 13, 21, 22, and 23. At a minimum, the location of these wells should be depicted on a site figure and presented in the RI report. Further, an analysis of the water level measurement obtained from the Pederson well should be attempted. Using the topographic map for the site, some basic analysis of this water level can be made with regard to the water levels measured at the site. This basic analysis should be able to determine if the water level is generally less than or greater than water levels measured at the site. This remains a very important issue.

2. p. 2-61 -- Although the well response tests were not intended to provide an accurate determination of hydraulic parameters, the water level information can be used to estimate hydraulic conductivity, storativity, etc. for inclusion in the FS.

RESPONSE: Comment partially addressed - There is no additional discussion regarding the hydraulic parameters listed in the comment, however, the R-N response to comments letter indicated that this information would be developed for use in the FS.

3. p. 2-65 -- The results, if valid, of the qualitative draw-down test on well MW-7D are very significant and important in the evaluation of hydrogeology of the site. The extent of fracture interconnection of well 7D with a large portion of the site is extraordinary. This test indicates that there appears to be a common fracture system between the numerous wells measured. A more detailed evaluation and potential

correlation of fracture zones in the affected wells should be considered for presentation in the RI.

However, there is some uncertainty regarding the results of the pump test at MW-7D. No long-term water level measurements for the period prior to the pump test or during recovery are provided. Consequently, it can not be determined if the lowering of water levels over such a large area was a result of the pump test or a natural feature. Another test should be considered given the potential that the pumping of well MW-7D could influence (control) ground-water flow over such a large portion of the site. Water levels in all wells at the site should be measured during any subsequent testing of MW-7D.

RESPONSE: Comment partially addressed - **The revised document does provide additional description of the interconnection of fracture zones in both this section and in Section 3.6. With regard to the pump test for well MW-7D, it is interesting to note that this well appears to be most fracture connected with wells MW-32D and MW-34D, all of which, coincidentally, are screened in the same depth interval (900 - 1000 ft msl). Additional pump-testing, however, remains recommended as an activity to consider during remedial design activities for optimum well placement considerations.**

4. p. 2-65 -- No water level measurements from well MW-34D are presented in Appendix I for the pump test of well MW-7D. Given that 2.19 feet of drawdown was reported in well MW-34D, this information is very important. The accuracy of the data presented needs to be verified.

RESPONSE: Comment addressed.

5. p. 2-85 -- Monitoring well drilling and construction logs for wells MW-0 through MW-7D, MW-9D through MW-19S, and MW-23S through MW-26S should be included in Appendix G.

RESPONSE: Comment addressed.

6. p. 2-87 -- The presentation of well construction specifications in this table is somewhat confusing. For example, the original total depth of MW-2D is listed as 64 feet while the original screen or open borehole length is 255 feet. It is also not clear whether some wells are screened or open and although the original screen/open intervals are indicated, reconstructed screened/open intervals are not listed in some cases. Table 2-5 should be checked for consistency with Appendix G and one or both revised accordingly.

RESPONSE: Comment addressed.

7. p. 2-93 -- This figure indicates that the bentonite seal is placed within the screened portion of the monitoring well. The well log information should be double-checked to ensure that this is not the case in any of the monitoring wells and the figure revised accordingly.

RESPONSE: Comment addressed.

8. p. 2-95 -- MW-36D is listed twice.

RESPONSE: Comment addressed.

9. p. 2-98 -- The RI report should indicate why monitoring wells MW-0D, MW-8D, MW-22SA, and MW-10D were not sampled.

RESPONSE: Comment partially addressed - The text states the reasons why these wells were not sampled, however, the reasons presented raise some additional questions. With regard to well MW-0D, the data collected at the time of the other site ground-water sampling activities should be presented for completeness. With regard to well MW-8D, it is stated that this well was installed to monitor water level information only; the use of this well solely for water level measurement appears to be a waste of a good water quality data point. With regard to well MW-22SA, given that this also is a recovery well, the data collected during the RI effort should be presented for completeness. Finally, with regard to well MW-10D, the explanation that this well is surrounded by nine monitoring wells and therefore was not sampled is not consistent with the fact that wells in close proximity elsewhere have been sampled. In summary, future ground-water sampling events should include these wells as sampling points.

SECTION 3 - PHYSICAL CHARACTERISTICS OF THE STUDY AREA

General Comments

1. Additional information to address the requirements of NEPA should be presented in this section. This includes information on cultural, archeological, natural and recreational resource features in the area. Specific guidance on addressing these areas was provided in EPA's letter dated May 20, 1991 (Attachment I).

RESPONSE: Comment partially addressed - Although there are now maps depicting flood plain and wetland areas, the text does not present any information regarding the presence or absence of cultural, archeological, or recreational resource features in the surrounding area and the wetlands have apparently not been verified in the field. The areas discussed in the letter of May 21, 1991 which have not been satisfactorily addressed are reiterated below.

A National Wetlands Inventory map was included but no other discussion of wetlands was provided. Wetlands should be determined by use of the 1989 Federal Manual for the Identifying and Delineating Jurisdictional Wetlands. A positive or negative determination should be made. This determination should be for onsite areas and off site areas to the limit of potential for contamination. Where wetlands are determined to be present, a more thorough analysis of the potential for contamination should be included. The presence or absence of wetlands should be field verified in addition to citing the National Wetland Inventory (NWI) maps. The NWI maps are not substitutes for on-ground, site-specific verification.

The State Historic Preservation Officer should be contacted regarding historic and/or archaeological sites. He/she will provide guidance on performing a Stage 1A survey.

Although coordination with the Fish and Wildlife Service is indicated for endangered species, this correspondence and all others regarding this effort, should be cited or included as a reference in an appendix.

Consult with the National Park Service regarding listed or proposed rivers which may be impacted by the site or its remediation. In addition any wildlife refuges, recreational areas or wilderness areas that may be impacted should be identified, affirmatively or negatively.

Specific Comments

2. p. 3-9 -- It may be useful to further evaluate the flow at Thornton Spring using the data presented in Martin (March 1979). Daily (?) flow rates for Thornton Spring are given for a one month period in this report. Evaluation of flow as related to precipitation during that period should be considered to obtain a better understanding of the flow mechanics of Thornton Spring. This may be useful in the evaluation of the contaminant flux through the Thornton Spring system.

RESPONSE: Comment NOT addressed - The flow at Thornton Spring and its relationship to contaminant flux remains unresolved. Although a figure is presented (Figure 1-9) showing the variation of contaminant concentrations for the period 1983 through 1991, there is no explanation of the variability of this data. For example, in early 1991, total VOC concentrations were measured to be greater than 7 mg/l, whereas two monitoring events later the concentrations appear to be less than 1 mg/l. This wide variation in the contaminant data is likely related to flow at the spring, however, with no flow data, this cannot be evaluated.

Determining the relationship between flow and contaminant flux is important in developing the monitoring strategy for the spring, especially with regard to the development of remedial action concentrations for spring discharge. Given that there appears to be a flow and flux relationship, it is recommended that flow be measured during future monthly water quality

collection activities such that sufficient data can be collected to evaluate this relationship in the FS or in a pre-design study.

3. p. 3-10 -- Site-specific geologic cross-sections using the information from selected on-site monitoring wells would aid in evaluating site hydrogeology. The cross-sections should include general lithology, location of water-bearing intervals, elevation of the water level in each well, and general well construction (including screened/open hole location). In section 4.0, cross-sections indicating the results of chemical analysis for total VOC's, mirex, and kepone would aid in evaluating hydrogeologic influences on contaminant fate and transport.

RESPONSE: Comment partially addressed - Although there are now cross-sections presented which show some of the elements requested, not all elements requested are included on the figures. For example, no water levels or well construction information is presented. In addition, no cross-sections with chemical data presented are included in Section 4.0. It is EPA's understanding that geologic cross-sections will be improved upon in the site's FS.

4. p. 3-17/Figure 3-9 -- The development of a soil/overburden thickness map should be considered. Although the bedrock surface contour map shows important information, a soil/overburden thickness map would be more useful in presenting the depth of soil, for example, that would potentially require remediation in a given area. This map would also be very useful for the feasibility study.

RESPONSE: Comment partially addressed - The text indicates that a soil/overburden thickness map will be provided on Figure 3-17. However, no figure was included in this version of the RI report.

5. p. 3-21 -- The inclusion of a description of the shallow soil/overburden aquifer at the site should be considered. This localized shallow aquifer is an important site feature, especially in the vicinity of the tank field. In this area, the shallow ground water provides the flow into the sumps and presumably the storm water outfall pipe at the fresh water drainage ditch.

RESPONSE: Comment partially addressed - The text describes the shallow water-table aquifer with respect to the sumps, but does not mention the storm water outfall pipe at the fresh water drainage ditch. Given that this outfall is a source of contaminants to the drainage ditch, its relationship to the shallow ground water table must be explained.

6. p. 3-22 -- It is unclear what distinction is made between wells monitoring the "shallow" versus the "deep" zones at the site. A table presenting the elevation interval monitored for each well should be considered. Only wells monitoring like elevation intervals should be considered for comparison.

RESPONSE: Comment partially addressed - However, it should be noted that it is very important to consider the comparison of like-elevation monitoring wells with regard to ground-water flow evaluation. For example, water levels collected from wells surrounding the tank field (i.e. wells 20, 21, and 22) should not be directly compared to water levels collected from wells 36, 39, and 40 because the latter wells are monitoring a zone over 150 feet deeper than the former. There are different water bearing zones (shallow and deep), as determined by the geophysics, pump-tests, and nested well data, and these different zones need to be evaluated separately.

7. p. 3-22 -- Although a detailed analysis of the ground-water flow conditions under non-pumping conditions is important, an analysis of ground-water flow conditions under pumping conditions (which is the more frequent condition) should be considered for this RI report. In addition, the relative elevation of Thornton Spring should be presented in the RI. Comparison of the relative elevation of the site water levels to Thornton Spring will provide a better characterization of the regional ground-water flow.

RESPONSE: Comment partially addressed - The report now includes some text and a figure depicting water levels at the site in early December 1992 during apparent pumping conditions at wells MW-0D and MW-7D. However, these data are not entirely clear. In addition, there appears to have been no attempt to correlate the water level at Thornton Spring (i.e. general elevation) with the water levels at the site as requested in the comment.

First, there appears to be no drawdown in well MW-7D, as the water level in this well is generally much higher than surrounding well water levels. During the previous pump test on MW-7D, the drawdown in this well was approximately 15 feet. Therefore, it appears that this well may not have been pumping during this measurement event.

Second, there appears to be no data provided for the drawdown measured in well MW-0D, and consequently, the evaluation of the pumping-influenced water levels cannot be completed.

Third, the extent of water level measurement in December 1992 is not very extensive. Water levels are only provided for a total of 14 wells. Given the complex nature of the ground-water flow at the site, data collection from all applicable monitoring points is desirable.

Given the limited data set, the equipotential lines are in some areas quite speculative. For example, there are no data presented that support the location of the 1010 elevation line drawn near building B-6, and the subsequent south/southwesterly ground-water flow direction

in this area. On the contrary, the data show a ground-water flow direction to the east/southeast. In addition, the data show a substantial divide in the vicinity of well MW-11D. Additional pumping scenario water-level data collection and revision of this figure should be considered. In summary, pumping centers at the site appear to have no influence on the potentiometric surface at the site.

8. Figures 3-11 and 3-12 -- Alternative depictions of the potentiometric surfaces for shallow and deep zones, based on an evaluation of similar monitoring zones, are attached. An alternative interpretation indicates a major component of flow to the northeast. These alternative interpretations should be evaluated and if necessary, addressed in the RI report.

RESPONSE: Comment addressed

9. p. 3-28 -- The Meizer and Earl (1977) study described the presence of several springs in the vicinity of the site, including two located along Struble Road, and one in the vicinity of the Skat Gas station on East College Avenue. Field verification of the presence or absence of these springs should be considered.

RESPONSE: Comment NOT addressed - There appears to be no evidence in the report that these additional springs were investigated and/or evaluated as agreed by R-N in the response to comments.

10. p. 3-30 -- A temperature measurement obtained from Thornton Spring during the March 1992 sampling event would have been very useful for comparison to site temperatures.

RESPONSE: Comment addressed

11. p. 3-38 -- The results of the U.S. Fish and Wildlife Services determination (Attachment II) dated June 20, 1991 concerning federally listed or proposed threatened or endangered species should also be reported. This letter was forwarded previously with the PNDI letter.

RESPONSE: Comment addressed

12. p. 3-40 -- The discussions for each area within the Study Area should include the results, including maps, of delineation of the wetlands and floodplains within the area. The ecological risk assessment will also need to be revised to involve wetlands and floodplains.

RESPONSE: Comment addressed

SECTION 4 - NATURE AND EXTENT OF CONTAMINATION

General Comments

1. Given the difficulties encountered during this RI with regard to kepone/mirex analysis, revision of the data tables in this section should be considered. For samples where no kepone or mirex was detected, the laboratory reported quantitation limit (e.g. <23 ug/l or <35 ug/kg, etc.) would be useful if presented in the data tables. In addition, samples for which the normal VOC quantitation limits could not be attained should be identified and actual limits presented.

RESPONSE: Comment addressed

2a. This section does not include any discussion of the extent to which the analytical results exceed ARAR's or background levels. This type of comparison needs to be provided either in the RI or the FS. The data summary tables at the end of the section should include columns for any applicable standards for the specific media. The data summary tables should also include frequency of detects, range of detects, and median concentration of a given compound in a given media. Based on the number and frequency of samples in excess of standards, summary tables indicating noncompliance with ARAR's by media can be prepared.

RESPONSE: Comment NOT addressed in this document - **However, the R-N response to comments letter indicated that this information would be provided in the FS report.**

2b. The presentation of historical data summaries in this section or section 1 should be considered. The review of historical fish, surface water, sediment, and ground water data would be useful in the evaluation of the completeness and adequacy of the recent RI data. Tables summarizing the historical data and figures showing sample locations should be considered.

RESPONSE: Comment to be potentially addressed in section 1.0.

3. Based on a review of the data for each media in each area, data gaps appear to remain regarding the nature and extent of contamination in the following areas:

- Tank Farm/Building # 1 Area - no apparent remaining data gaps
- Designated Outdoor Storage Area - extent of surface soil contamination
- Former Temporary Drum Repackaging Area - extent of subsurface soil contamination; extent of surface soil contamination
- Former Spray Area - horizontal extent of kepone/mirex contamination
- Production Building #2 Area - no apparent remaining data gaps
- Freshwater Drainage Ditch - vertical extent of sediment contamination;
- Thornton Spring - vertical extent of sediment contamination

- Spring Creek - downstream extent of kepone/mirex sediment contamination; presence of kepone/mirex contamination in Spring Creek flood plain deposits; vertical extent of sediment contamination.
- Ground Water - source of contaminants near building B-14; source of contaminants detected in MW-40D.

RESPONSE: Comment to be potentially addressed in section 1.0 and in a pre-design study.

4. Site-specific figures depicting the estimated areal extent of contamination for each of the areas of interest should be considered for this RI report. Cross-sections depicting the vertical extent of contamination (and location of the water-table) in certain areas (i.e. Fresh Water Drainage Ditch, Drum Repackaging Area, Outdoor Storage Area, Tank Farm, etc.) may also be useful. This information will be useful for the feasibility study in determining the volumes of contaminated areas present, etc. These depictions would also allow for the evaluation of how the data collected will be extrapolated to address areas where no data was collected.

RESPONSE: Comment NOT addressed. It does not appear that this comment has been considered in the revised RI report. However this will apparently be addressed in the FS.

Specific Comments

5. p. 4-21 -- A comparison is made between concentrations of inorganics detected at the site and reference concentrations. A table listing the reference concentrations and site concentrations should be considered for documented comparison purposes.

RESPONSE: Comment addressed.

6. p. 4-34 -- The presence of volatile compounds (trichloroethene, tetrachloroethene, and toluene) in this area is peculiar, given that the surface soil in this area is apparently fill material from recent (last 10-15 years) times. An expanded discussion of the history of this area should be considered to help evaluate the potential for contamination in this area.

RESPONSE: Comment does NOT appear to be addressed. There appears to be no additional discussion regarding this area. However, based on R-N's response to comments letter, this may be included in the revised historical section.

7. p. 4-37 -- A summary presentation of historical soil quality data for the Former Spray Field should be considered, and be included in this section or section 1. For completeness, previous surface and subsurface soil information for this area should be presented to support the rationale for limited sampling of this area during this RI.

RESPONSE: Comment is NOT addressed in this section. This comment will be addressed in Section 1.0.

8. p. 4-49 -- The high concentrations in surface water and sediment associated with the storm water outfall indicate that this discharge was previously (currently?) a major source of contaminants to the surface water and sediment of the Fresh Water Drainage Ditch. A more detailed delineation of the origin of this discharge should be considered.

RESPONSE: Comment NOT addressed in this section. No additional discussion regarding this issue is presented as agreed to in the response to comments letter.

9. p. 4-49 -- The depth discrete sampling of the sediments revealed the presence of substantial contamination at depth in the ditch. Given these findings, the quality of sediment at depth along the entire ditch is suspect, and additional characterization of vertical sediment quality should be considered, for both the drainage ditch, Thornton Spring, and Spring Creek.

RESPONSE: Comment NOT addressed in this section. No additional discussion regarding this issue is presented. However, based on R-N's response to comments letter, this will be included in a pre-design study.

10. p. 4-57 -- The levels of VOCs in sample A1 are reported to be higher during the first round on Figure 4-7.

RESPONSE: Comment addressed.

11. p. 4-71 -- There is no indication as to the potential source of the volatiles detected in well MW-39D. There appears to have been no prior investigation in this area around building B-14. Given that this well appears to be upgradient from the identified major source areas, the water quality in this well indicates a potential area of concern in the southeastern portion of the site may exist. This possibility should be further characterized and/or evaluated.

RESPONSE: Comment partially addressed. Although there is additional discussion regarding this issue, the text attributes the source of the contaminants in well MW-39D to originate off-site. Although this may be one of the sources of contaminants in this area, additional evaluation of the southeastern portion of the site should be considered. In

addition, the RI Report must also acknowledge that structural controls on contaminant migration could account for the presence of VOC's at MW-39D. Contaminants migrating along structurally controlled bedding plane features dipping in a southerly direction is as plausible an explanation for the contamination at MW-39D as other potential sources located hydraulically upgradient.

12. p. 4-71 -- Further evaluation of the data collected from well MW-40D should be considered. First, although similar in chemical signature as samples collected from the tank farm area, a very high concentration of vinyl chloride was detected in this well; very little vinyl chloride was detected in the tank farm wells. Second, well MW-40D is located over 600 feet across strike from the tank farm, and although this location is an anomalous ground-water low, because of the karstic features believed to be present in the vicinity of the tank farm, ground-water flow from the tank farm toward MW-40D may not occur. An alternative explanation for the occurrence of contamination in this well should be considered. The possibility of other source areas should be considered and evaluated.

RESPONSE: A detailed explanation is provided to address this comment. However, the explanation is not fully convincing with regard to the flow of ground-water across major site geologic features. This contradicts the RI's detailed explanation that flow is parallel to these features rather than perpendicular.

13. p. 4-72 -- With regard to the water quality at well MW-29D, the explanations presented for the source of contaminants in this well may not be the only answer. The presence of low levels of volatiles in several "upgradient" locations (MW-1D, 2D, and 27S) as well as MW-29D indicates that other sources may be possible. Former spray operations in this area may be the possible source of these contaminants.

RESPONSE: Comment addressed.

14. Table 4-3 -- The soil sampling results for metals in this table are labeled as ug/kg, but appear to actually be mg/kg. This apparent error calls into question the organic results, which are also labeled as ug/kg. EPA need assurance that the organic concentration data were correctly labeled.

RESPONSE: Comment addressed. The table now contains the correct units.

15. Table 4-10 -- The air sampling results, both in the RI and in the risk assessment, should be converted from parts per billion to ug/square meters. This conversion must have been made in order to calculate risks, which cannot be done with volume/volume air concentrations. Since the risk assessment must be based on mass/volume concentrations, the air data should be presented in these same units throughout the document.

RESPONSE: Comment addressed. **The correct units are now presented.**

16. General ground water data observation -- Based on a review of the data, it is clear that the "downgradient wells" (MW-6D, 7D, 10D, 32D, etc.) do not appear to be monitoring the major subsurface conduits that are providing flow to Thornton Spring, given that concentrations detected at the spring are much higher than those detected in the downgradient wells.

RESPONSE: No response required.

SECTION 5 - CONTAMINANT FATE AND TRANSPORT

General Comments

1. A more detailed discussion regarding the fate and transport of contaminants through the soil should be considered in this section. Specifically, calculations of contaminant migration through the soil to the ground water will be useful in determining soil cleanup goals, which are required to evaluate remedial technologies and alternatives in the feasibility study. For example, it should be determined what concentration of contaminants are currently leaching to the ground water given the concentrations of contaminants found in the soil at the site. The rate of this migration is also another useful calculation. This information will be required to determine what soil contaminant concentrations are acceptable to prevent ground water contamination from exceeding ARARs.

RESPONSE: Comment NOT addressed. **There is no additional information presented regarding fate and transport of contaminants through the soil. However, based on R-N's response to comments letter, this will be included in the FS.**

Specific Comments

2. p. 5-9 -- Photodegradation of mirex to photomirex should also be discussed here.

RESPONSE: Comment addressed.

3. p. 5-11 -- Additional discussion regarding rate of ground-water contamination migration at the site should be considered.

RESPONSE: Comment addressed.

4. p. 5-14 -- With regard to the discussion of the data from well MW-40D, refer to comments regarding this well location presented previously.

RESPONSE: Comment addressed.

5. p. 5-16 -- It does not appear that the storm water drainage and collection system in the vicinity of the production buildings has been previously described in the RI. In addition, the text describes a pipe at the freshwater drainage ditch which was part of the former storm water collection system, although no description of this former system is provided. A description of how storm water was previously and is currently collected at the site should be considered to evaluate former and current migration pathways related to surface water discharge.

RESPONSE: Comment partially addressed - **Although the RI document now describes the general stormwater drainage system at the site, there appears to be no further discussion of the drainage pipe that discharges to the freshwater drainage ditch as agreed to in the response to comments letter..**

6. p. 5-18 -- Additional discussion regarding sediment transport in Spring Creek should be considered. The determination of sediment transport rates are important for evaluating whether or not contaminant migration via sediment transport is predominantly occurring continuously or only during periods of high flow. In addition, additional description of the morphology of Spring Creek (i.e. depth profiles, thickness of sediment, floodplains, depositional vs. erosional areas, etc.) should also be considered to supplement the sediment transport discussion. Evaluation of sediment transport rates may also provide a better understanding of how the quality of sediments in Spring Creek would change should the source of contaminants (Thornton Spring/Freshwater Drainage Ditch) be removed.

RESPONSE: Comment NOT addressed - **There appears to be no additional discussion regarding the role of sediment transport of contaminants in Spring Creek. The response to comments letter states that this will be addressed in the FS.**

SECTION 6 - BASELINE RISK ASSESSMENT

HUMAN HEALTH RISK ASSESSMENT

General Comments

1. Several problems were found with the exposure assessment which would indicate that estimated risks are not consistent with the "reasonable maximum" case. Many of the exposure parameter values appeared to be much lower than a "reasonable maximum" parameter value and some values specified in USEPA's supplemental guidance (1991) were not used (e.g., ingestion rate for fish). In addition, the methodology for estimating exposure point concentrations did not appear to be consistent with USEPA guidance and Region III guidance resulting in the underestimation of exposure point concentrations. Also, certain pathways of concern (particularly related to future land-use of the site) were not evaluated.

RESPONSE: Comment partially addressed - This comment will be adequately addressed by incorporating the comments noted below.

2. As a result of the approach taken in the toxicity assessment (the omission of the currently available slope factors for mirex and kepone) and the questionable methods used in the exposure assessment, the risks for certain exposure pathways could be underestimated. Therefore, the results of the draft baseline risk assessment could significantly change.

RESPONSE: Comment partially addressed - This comment will be adequately addressed by incorporating the comments noted below.

SPECIFIC COMMENTS

3. Tables 1-7, summaries of sampling results -- It is unclear how duplicate samples and first vs. second analyses were handled in the risk assessment. For example, Table 3 shows 39 samples for most ground-water contaminants, which would appear (based on Table 4-11 of the RI) to include some, but not all duplicates and repeats. Criteria for retaining and dropping specific samples should be explicitly stated.

   Also, many of the maxima shown in Table 3 are lower than the maxima in Table 4-11 of the RI. This appears to arise from the use of only the second analysis of some samples, which was usually lower in concentration. This practice should be either explained or changed, both here and in the tables of estimated exposure concentrations.

RESPONSE: Comment NOT addressed - On page 19 of the baseline risk assessment, the justification for using the second round of samples and disregarding the first round of data

in the risk assessment may not be appropriate. It is assumed that the data qualifiers being discussed do not involve rejection (i.e., R qualifiers) or high blank contamination issues as mentioned in the previous 2 bullets on page 19. If this is the case, then disregarding the first round of data just because there were more qualifiers may not be appropriate, particularly if the first round of data had higher detected values than the second round. If the first round of data had higher detected values, then this data should be included in the baseline risk assessment.

4. Table 8, summary of detections -- Based on the location of SW/SED-4 on Figure 2-1 of the RI, and on the analytical data for the surface water sample taken there, the following contaminants should be shown in Table 8 as detected in creek water: benzene, chlorobenzene, 1,2-dichloroethene, ethylbenzene, 1,1,2,2-tetrachloroethene, toluene, TCE, vinyl chloride, xylenes, mirex and kepone. Table 20 should also be revised to reflect this change.

RESPONSE: Comment addressed.

5. p. 27 -- Region III has been informed that the RfD work group has developed a new RfD for mirex. Assuming this information proves correct, this value should be used in the revision of the risk assessment.

RESPONSE: Comment addressed.

6. Table 9 -- When appropriate reference doses and carcinogenic potency slopes are not available, the Superfund program relies on the EPA Environmental Criteria and Assessment office (ECAO) to provide its judgement of appropriate values, based on current knowledge. At the request of EPA Region III, ECAO provided oral slope factors for mirex and kepone.

   If CRAVE does not develop new Agency consensus slope factors for these compounds by the time the risk assessment is revised, then ECAO's interim values for these contaminants must be used. Listing the slope factors as "not available" and thereby eliminating carcinogenic effects of kepone and mirex from the risk assessment is not acceptable.

   In addition, the following additions and changes should be made to the table of toxicological constants: appropriate values for TCE and PCE.

RESPONSE: Comment partially addressed - R-N's Response to comments on p. 17 (comment #6) list the cancer slope factor of 0.36 $(mg/kg/day)^{-1}$ for mirex. However, on p. 26 of the baseline risk assessment a slope factor of 0.34 $(mg/kg/day)^{-1}$ was used in the risk assessment. Which slope factor is correct?

7. Section V., Identification of Exposure Pathways -- The selection of exposure pathways and scenarios, and of exposed populations, is seriously deficient. First, the site is surrounded by residential housing, and there is no assurance that the site will not be developed as a residential area in the future. Therefore, the risks from possible future residential use of on-site ground-water and contact with on-site soils must be assessed. Given the profound levels of VOC contamination observed on-site, these risks are much too important to ignore.

   Second, the exposure assessment for on-site workers should include daily contact with contaminated surface soils in addition to episodic contact with deep soils. Worker exposure to surface soils should be based on samples SS-5 to SS-10, rather than the spray field samples used for trespasser exposures.

   Finally, residents (not just recreational visitors) along Spring Creek need to be included in the population that is potentially exposed via direct contact with off-site surface water and sediments during activities such as fishing and wading. In addition, the potential exposure to residents via incidental ingestion and dermal contact with floodplain soils during activities such as playing and gardening in backyards needs to be discussed. The risk from exposure to floodplain soils should be shown to be insignificant by using Spring Creek sediment concentrations to project worst case-scenario for floodplain concentrations.

RESPONSE: Comment partially addressed - The second draft report incorporated the pathways listed. However, on page 1 of the baseline risk assessment and throughout the report the additional exposure pathways are listed as "worst-case" scenarios. USEPA did not characterize the additional pathways to be included in the risk assessment as "worst-case" scenarios, but rather pathways to be evaluated under a "reasonable maximum case" (RME). Use of the term "worst-case" scenario should be removed from the report.

8. p. 72 -- As stated in previous RI comments, the apparent potential use of a private well located in the area needs further investigation.

RESPONSE: Comment addressed.

9. p. 73 -- The presence of a fence restricting cattle from ingesting surface water is of no consequence when considering future land-use conditions in the area. In addition, potential agricultural use of land closer to the site under future land-use conditions should be considered. Therefore, it may be necessary to evaluate potential exposure via ingestion of beef given the presence of chemicals which may bioaccumulate in the food chain (e.g., mirex and kepone).

RESPONSE: Comment addressed.

10. p. 75 -- It is unclear how non-detects were handled in the estimation of exposure concentrations. Also, the treatment of duplicate samples and repeat analyses is unclear. These details should be explained and defended.

RESPONSE: Comment addressed.

11. p. 75 -- Specify the equation used for estimating the 95th UCL on the arithmetic mean. For lognormal distributions, was the equation developed by Land (1971, 1975) used as presented in Gilbert (1987)? Was the distribution of each chemical considered when selecting the equation for estimating the 95th UCL on the arithmetic mean? Provide more details on the methods used and rationale for selection. Of the available methods, the equation for estimating the 95th UCL on the arithmetic mean assuming a lognormal distribution (i.e., Land [1971, 1975]) should be used in most cases where the distribution is positively skewed and similar to a lognormal distribution. The equation which assumes a normal distribution should only be used when the chemical distribution is normal (which is rarely the case).

RESPONSE: Comment addressed - The second draft report adequately addressed this comment. It should be noted, however, that the argument made by in the risk assessment with respect to the Central Limit Theorem does not appear to apply. The Central Limit Theorem suggests that the population arithmetic mean concentration should be used as the exposure point concentration regardless of the underlying distribution. However, the best method for estimating the 95th upper confidence limit on the arithmetic mean concentration from a sample is dependent on the underlying distribution. If the distribution is lognormal, then the Land method should be used for estimating the 95th UCL on the arithmetic mean (which was adequately performed in the second draft of the report).

12. p. 77-87 -- It appears that all the RME EPCs were estimated using the equation for calculating the 95th UCL which assumes a normal distribution. Based on personal experience, the estimates presented in this table appear rather low given the results typically derived when using the more appropriate method developed by Land (1971, 1975) which assumes a positively skewed distribution.

RESPONSE: Comment addressed

13. Table 19, estimate of exposure concentrations for off-site ground-water -- EPA Region III's policy for estimating exposure to contaminated ground water is to select a single well or cluster of wells as an exposure point, rather than averaging across wells. This policy is based on the assumption that residents are exposed to water withdrawn from a single location, and it is reasonable to think that a well could be located in the most contaminated part of the aquifer.
Thus, the off-site ground-water exposure concentration should be based solely on results from Thornton Spring, rather than an average of samples from three off-site

monitoring wells and the spring. This reflects the possibility that the spring could be used as a drinking water source in the future.

RESPONSE: Comment addressed

14. p. 90 -- Table 23 which presents chemicals estimated in beef and milk is not referenced in the text.

RESPONSE: Comment addressed.

15. p. 92, Foster & Chrostowski showering model -- The factor of 2 used in the estimation of the average contaminant in the shower stall was not described in the referenced paper. Concentration averaging has already been accounted for by the integration step; an additional halving of the concentrations is incorrect.

RESPONSE: Comment addressed. The basis of EPA's disagreement with the use of the Foster and Chrostowski showering model in the draft RI was actually caused by the use of a different version of the model then EPA uses. Environ used the 1986 version, and our comments were based on the 1987 version, which is far superior. Technically, their position is correct, but their exposure estimates were still low by about a factor of 2 when compared to output from the 1987 model under the same conditions. Paul Chrowstowski was contacted as suggested, and he did reportedly state that the factor of 2 was correct. However there is no mention whether Dr. Chrowstowski also mentioned that the 1986 model was obsolete.

Overall, changing to the 1987 model would substantially increase the risk estimates due to inhalation during showering, which would significantly increase the total risks at the site. However, those risks are already so high that this would be unlikely to change the cleanup decision. Since the model used was published in the literature, and they have the blessing of one of the authors for their adaptation of it, this issue will not be pursued further at this time. However, Environ should be advised to use the 1987 version of Foster and Chrowstowski's model for future risk assessments.

16. Children as receptors -- In assessing risk from non-carcinogens, EPA Region III considers children to be sensitive receptors because of their generally higher rates of contaminant intake per kilogram of body weight. Accordingly, children should be assessed separately for non-carcinogenic effects for all residential exposure scenarios, especially residential ground-water use and direct soil impact.

RESPONSE: Comment addressed.

17. p. 99 -- USEPA's recent guidance concerning dermal permeability constants (USEPA 1992) should be used in this section.

RESPONSE: Comment addressed.

18. Table 28 -- The inhalation rate during showering should be 0.83, not 0.6 cubic meters/hour.

RESPONSE: Comment addressed.

19. p. 105 -- The exposure frequency used to estimate potential exposure to surface water and sediments does not appear to be an upper-bound assumption. Children often have specific locations where they repeatedly play during the summer months. A higher exposure frequency should be used when estimating exposure to children playing in streams.

RESPONSE: Comment addressed.

20. p. 107 -- Assuming 3/4 of the fishing occurs in locations other than Spring Creek does not have a technical basis. Although, some fisherman do fish in several locations, others may fish in their favorite fishing location numerous times. Therefore, it may not be appropriate to apply the correction factor of 25% to the exposure frequency.

RESPONSE: Comment addressed.

21. Table 30 and elsewhere -- The averaging time for trespassers and non-carcinogens should be 3285 days, not 4380 days.

RESPONSE: Comment addressed.

22. p. 111 -- The correction factor of 25% does not appear to be warranted given the fact that children often engage in activities that would result in soil exposure in the same location over extended periods of time. Although children may not play in the same location all day, they may receive the majority of their 100 mg/day exposure while playing in soil at the site and a relatively low amount during other play activities (e.g., watching television, playing on a paved play ground, etc.). Therefore, it may not be appropriate to apply the correction factor of 25% to the ingestion rate.

RESPONSE: Comment addressed.

23. p. 114 -- The exposure frequency for children and workers do not appear to represent upper-bound values. Many construction projects that involve contact with soil last more than 10 days. See comment 14 concerning the exposure frequency value for children.

RESPONSE: Comment addressed.

24. p. 117 -- Previous comments concerning evaluation of soil also apply for sediment, perhaps with the exception of the exposure parameter values used to estimate exposure to the small children.

RESPONSE: Comment addressed.

25. p. 120/Table 34 -- The assumptions for fish ingestion do not consider the potential high quality of the fishery in Spring Creek, or the possibility that some individuals may use it for subsistence fishing, at least in season. Thus, the exposure estimate cannot be considered an RME exposure scenario. The Supplemental Guidance (USEPA 1991) recommends using an annual average ingestion rate of 54 g/day of fish for recreational fisherman (USEPA 1991). Since this value is an annual average, the exposure frequency should be 365 days. If evidence is produced that this stream cannot produce enough fish to support this assumption, then this ingestion rate may be revised downward accordingly.

RESPONSE: Comment addressed.

26. p. 123 -- The last sentence in the last complete paragraph on this page should be deleted or revised. Summing the increased probabilities of developing cancer does not necessarily depend on the assumption that the chemical agents act by the same mechanism of action since the risks are independent probabilities of contracting a cancer which may ultimately result in death from a specific carcinogens.

RESPONSE: Comment addressed.

27. p. 126-131 -- The risks presented in these tables will increase significantly (in certain cases by more than 3 orders of magnitude) if the comments presented above are adopted including recalculating EPCs as specified, changing exposure parameter values, and using toxicity criteria presented in HEAST and IRIS (if appropriate).

RESPONSE: Comment addressed.

28. p. 132 -- It may not be appropriate to assume that the site will always be paved under future land-use conditions. The current zoning status of the property does not prevent significantly altering the use of land for industrial use (e.g., replacing

buildings, removing asphalt and gravel and restoring grass lots, etc.). Therefore, exposure to soil directly underneath paved areas should be considered for future on-site workers and trespassers (including areas which are currently fenced).

RESPONSE: Comment addressed.

29. p. 136 -- Region III accepts the use of Monte Carlo analysis to express quantitatively the uncertainties in risk calculations. However, the resulting probability distribution of risk is no better that the input distributions. At least one input distribution (tap water intake) is inconsistent with current knowledge.

RESPONSE: Comment addressed.

30. p. 147 -- When comparing the 95th percentile of risk with the RME risk estimate one may conclude that the RME is similar to the 95th percentile given the uncertainty associated with the risk assessment process and the inherent uncertainties and limitations of the Monte Carlo simulation (e.g., the inner correlation between body weight and ingestion rate were not considered and many assumptions were made concerning the distribution of the input parameters).

RESPONSE: Comment NOT addressed - The response did not adequately address the comment (further explanation of the comment is provided). The issue expressed in the comment was that the discussion of the Monte Carlo results was not balanced (second paragraph of Section 2 on page 163). The discussion gives the impression that the risk estimates presented in the baseline risk assessment for the RME case are much more conservative than those obtained from a more refined Monte Carlo simulation. Using percentages to compare the results gives the impression that the RME results are significantly different and are not "reasonable maximum" results. On the contrary, the results of the Monte Carlo simulation appears to support the RME results of the baseline risk assessment. Given the assumptions and uncertainty in the Monte Carlo simulation, the RME results appear similar to the 95th percentile. A 2.63 factor difference (i.e., 263%), which was the highest reported difference in the results, is insignificant in the field of predictive risk assessment (particularly the 27% difference report in the text). If the difference was an order of magnitude (10 times or 1000%), then there may be a disparity in the results. It is not surprising that the RME results were an order of magnitude above the 50th percentile, since the RME should reflect an upper-bound risk estimate and not an average or typical risk estimate.

ECOLOGICAL RISK ASSESSMENT

General Comments

1. Ideally, it would have been useful if more detailed descriptions of the habitats found within the study area were given. It would be possible to gain additional information without having to visit the site. Further direction on this is found in the Specific Comments section.

RESPONSE: Comment addressed

2. Overall, the environmental risk modelling was well done. However, additional descriptions of the modelling techniques used by Newell, et. al. (1987), which were used in this document, should be included. See the comment on p. 7-12 under Summary and Conclusions for specific concerns regarding the treatment of threshold concentrations and ratios.

RESPONSE: Comment partially addressed - **The evaluation of volatile organic compounds in the RMU2 and RMU3 areas should be considered, given that there are extensive amounts of volatile organics in the surface water and sediment in these areas.**

Specific Comments

3. pp. 157-160 -- The wildlife description appears to be limited. The animals mentioned in the description (i.e., mammals, amphibians, reptiles, birds, and invertebrates) could be found almost anywhere in Pennsylvania. This does not adequately characterize the wildlife found in the habitats within the study area. The PADER Regional Biologist or Pennsylvania State University faculty may supply more detailed information.
   Little detailed vegetative descriptions were present. In order for the reader to obtain an accurate picture of the RMUs, estimates on the vegetation densities and species would be extremely useful.

   The stream characterizations should probably consist of more detailed descriptions. Information such as stream width, depth, riffle/run/pool ratios, high water marks, detritus/muck ratios, erosion potential, etc., should be included to the existing information. For further guidance, see the USEPA Guidance: *Rapid Bioassessment Protocols For Use In Streams And Rivers, EPA/444/4-89-001.*

RESPONSE: Comment partially addressed - **Although there is now sufficient description of fauna, there remains little description of the flora and Spring Creek stream characteristics.**

4. pp. 163-167 -- The chemical description for Mirex and Kepone were relatively well done. However, literature review indicates that long term exposures to Mirex may be necessary before toxicity occurs. Therefore, short-term toxicity tests may not have sufficient exposure durations to adequately assess the toxicity of mirex to aquatic organisms.

RESPONSE: Comment partially addressed - The text describes the results of the acute and chronic tests, however, it does not describe the uncertainty regarding these tests in evaluating the long-term effects of exposure to mirex and kepone. This uncertainty and the limitations of the study should be presented in the document and conclusion section. Further, the ecological risk assessment does not include the results of the sediment toxicity testing, and consequently is not complete.

SECTION 7 - SUMMARY AND CONCLUSIONS

General Comments

1. The summary and conclusions section will likely have to be revised based on the comments presented previously.

RESPONSE: Comment partially addressed - The summary and conclusions may require additional revision based on the final RI comments.

Specific Comments

2. p. 7-4 -- The summary description of the nature and extent of contamination in the Freshwater Drainage Ditch does not discuss the nature and extent of the contaminants at depth. Additional description of contaminants found at depth should be considered.

RESPONSE: Comment NOT addressed - As stated previously in these comments, this remains an outstanding issue. The R-N response to comments letter stated that this comment would be further addressed in a pre-design study.

3. p. 7-5 -- The summary description of contamination of Spring Creek does not present the nature and extent of mirex and kepone contamination of the stream sediment. Additional description of this contamination should be considered.

RESPONSE: Comment NOT addressed - As stated previously in these comments, this remains an outstanding issue.

4. p. 7-7 -- With regard to ground-water quality at the site, note that the phrase "relatively uncontaminated" is very subjective. For example, Commonwealth of

Pennsylvania ARARs consider the presence of any organic compounds above background (i.e. zero) to be "contaminated." Consider using a different approach to describing levels of contaminants in this section and other sections of the RI report.

RESPONSE: Comment addressed

5. p. 7-8 -- With regard to the risk assessment, summary and conclusions may need to be revised based on the response to comments presented for Section 6 (Risk Assessment).

RESPONSE: Comment addressed

6. p. 7-10 -- This section states that no drinking water wells exist within the study area and it is extremely unlikely that commercial, industrial, and residential occupants in the study area would use local ground water as a water supply source in the future. The Meiser and Earl report and the recent off-site survey have identified residential wells located within the study area that are used for domestic purposes. The RI report should either verify that these wells are not currently used for residential purposes or acknowledge the existence of these as residential wells. The risk assessment should also be revised accordingly.

RESPONSE: Comment partially addressed - **Based on the information presented in the RI document, the off-site wells remain a potential issue that needs further evaluation (see previous comments in Section 2.0, Comment 1.**

7a. p. 7-12 -- The document states that "exposures were based on measured levels... and on... levels using generally accepted models..." These models, discussed in Appendix K, are not universally accepted. These models and their assumptions are the basis for the determination that a ratio "of less than 10 but greater than 1 indicate some potential, but relatively low risk..." It is uncertain what kind of exposure is assumed in the risk characterization: it could, for example, be either administered does or absorbed dose or some other route. In either case, however, the does is probably too high to be considered a reasonably conservative approach. We generally recommend a hazard quotient of 1 with any number higher than that considered to be potentially threatening. Consequently, further justification is required in order to explain why ratios of less than 10 but greater than 1 represent only a low risk potential. Lacking any additional justification, EPA recommends using the hazard quotient of 1 as a cutoff criterion for developing the potential for risk. Remedial action objectives should also be developed for all ecological receptors having an exposure-to-toxicity ratio equal to or greater than the final cutoff criterion.

RESPONSE: Comment addressed

7b. p. 7-15 -- The primary objectives presented in the text for soil and sediment do not specifically address soil/sediment contamination impact on ground water. Soil and sediment remedial actions should also prevent the release of contaminants to ground water at concentrations greater than ARARs. The revision of Table 7-1 to include this objective should be considered.

On page 173 of the Environmental Risk Assessment, the food chain is specifically stressed as a pathway for predator exposure to contaminants. Therefore, this pathway and these receptors should be equally stressed in the development of Remedial Action Objectives.

RESPONSE: Comment addressed. However, for the purpose of consistency with EPA's December 31, 1992 comments on the Initial Preliminary Identification of Potential Applicable or Relevant and Appropriate Requirements (ARARs) and Remedial Action Objectives (RAOs) Report, any future revisions to Section 7.2 of the RI must also address comment #14 - 20 from EPA's letter of December 31, 1992.

8. Table 7-1 -- The following remedial objectives should be considered:

- The overall reduction of toxicity, mobility, and volume of contaminants present for all media.
- The restoration of sediment quality as impacted by site contaminants for the enhancement and protection of aquatic habitat.
- The restoration of ground-water and surface-water quality at the site.

RESPONSE: Comment addressed. However, for the purpose of consistency with EPA's December 31, 1992 comments on the Initial Preliminary Identification of Potential Applicable or Relevant and Appropriate Requirements (ARARs) and Remedial Action Objectives (RAOs) Report, any future revisions to Section 7.2 of the RI must also address comment #14 - 20 from EPA's letter of December 31, 1992.

CENTRE COUNTY KEPONE SITE
FINAL RI REPORT REVIEW
(ADDITIONAL COMMENTS NOT CONTAINED
IN EPA'S SEPTEMBER 15, 1992 LETTER)

1. **General Comment** - As noted in the enclosed PADER comment letter and in comment #1 of EPA's December 31, 1992 comments on the Initial Preliminary Identification of Potential Applicable or Relevant and Appropriate Requirements (ARARs) and Remedial Action Objectives (RAOs) Report, the site description is inaccurate in that it coincides with the R-N property only. In accordance with the National Contingency Plan (NCP) at 40 C.F.R. § 300.5, the site must include the areal extent of contamination, including but not limited to the aquifer, Thornton Spring and that section of Spring Creek which is designated as a no-kill zone.

2. **Page ES-4** - It is inappropriate to artificially combine two separate sampling stations under RMU4. By doing this, the upstream background sampling station has been eliminated, and as a result, the risk assessment fails to distinguish between impacted areas and non-impacted areas. There is a concern that the statement in the executive summary, "no toxic effects are predicted for Spring Creek water" is based upon this artificial combination. By combining two sample stations, it is impossible to reach this conclusion because the Environmental Risk Assessment document clearly shows a potential risk to aquatic organisms and to predatory wildlife that use the creek as a feeding ground. RMU4 must therefore be defined to consist only of data from SW3/SED3 and that data from SW6/SED6 be coupled with the data used for RMU2. The statement that Thornton Spring contributes less than 5% of the total flow in Spring Creek must also be modified to address the following comments #8 and #10 specific to this issue.

3• **Page ES-5, second and third paragraph** - The following phrases imply improper conclusions: "to a lesser extent," "low levels," and "low concentration: when used to describe presence or absence of mirex and kepone in sampled media. These modifiers imply low to no risk associated with the presence of these contaminants and tend to discount the high toxicity associated with small amounts of these contaminants as reflected in the Environmental Risk Assessment.

4• **Page ES-5, third paragraph, last sentence** - After noting that mirex and kepone were detected in Spring Creek fish samples, it should also be noted that the levels of these contaminants have been consistently above FDA action levels (Kepone - 0.3 ppm and Mirex - 0.1 ppm). The baseline risk assessment contained in Appendix K is not adequately summarized in either the Executive Summary or the text.

5. **Page ES-6** - The reference to 40 CFR §300.68(f) is incorrect. Most likely the correct citation is 40 CFR §300.430.

6. **Section 1, Figure 1-9** - We note that Figure 1-9 shows varying levels of VOCs in Thornton Spring water. The levels are also listed as "monthly averages". No information is given of the variation within months. Maximum concentrations, not monthly averages, of toxic chemicals (such as VOCs), depending on duration, are the most useful in determining possible toxicity.

7. **Section 2.1.2., Surface Water and Sediment Investigations** - This section does not provide the physical parameters of TOC and grain size. Further, these physical parameters are not provided or discussed throughout the document. Selection of remedial alternatives addressing sediment contamination must consider both chemical results and these physical parameters.

8• **Section 2.1.7., Toxicological Investigations, Water Sources to Spring Creek** - More flow information is needed to assess what affect Thornton Spring might have on Spring Creek. It is not sufficient to describe flow in the spring and the creek at the time of testing and state that (paraphrased), Thornton Spring has no effect on Spring Creek. This report calculates a 7Q10 with seven years of data, which is certainly not long enough, and also calculates a Thornton Spring contribution that uses the low flow figures from both the spring and the creek. Until it can be shown that the spring and creek flows mirror each other, the worst case conditions must be assumed. Therefore, calculating the contribution using the highest spring flow and the lowest stream flow results in approximately a 16% contribution.

The Ditch and Thornton Spring are, like Spring Creek, "waters of the Commonwealth" and must be considered in their own right. PADER considers the Ditch to be an "unnamed tributary to Spring Creek", according to the company's NPDES permit. Thornton Spring flows through a well-defined channel for 300 feet before its confluence with Spring Creek. Its attainable use, absent the pollution, should be much the same as other natural springs in the basin, which typically support thriving invertebrate communities and recurrent fish populations. The aqueous phase testing results have clearly shown that Thornton Spring Water is chronically toxic. The permitted effluent is also chronically toxic (decreased reproduction at 60% and above). The report should also discuss how the actual biota of the Ditch and Thornton Spring are affected by the toxins from the site.

9• **Section 2.1.8, Fish Sampling Investigation** - Given the importance of fish tissue samples to help define the extent and effect of site contaminants, this document fails to utilize all of the available fish tissue data from the previous investigations for the calculation of relative risk in the environmental risk assessment section. Development of remedial alternatives for surface water and sediment pathways should consider results from all fish tissue analysis investigations, not merely the most recent. These same comments apply to Section 7 of the report and the Environmental Risk Assessment.

10. **Section 3.3, Surface Water Hydrology, page 3-11; Appendix H; Appendix J** - We do not believe that a low flow calculation using seven years of gauging data is very reliable. The reference text that Dr. March cites in Appendix J for the employed method (Linsley et al. 1975) also states that "It thus appears that records shorter than 20 y should not be used for frequency analysis" (p 340). While this was found in a section headed "Flood Probability," we contend that guidance for low-frequency, high-flow events also holds for low-frequency, low flow events. A later section headed "Drought" (p 360), states that "occurrences of drought conditions in recorded stream flow are generally two few for frequency analysis," but then goes on to describe the method employed by Dr. March for the RI. So while the method is valid, the data are insufficient. We note that the Northcentral Office of PADER used a 7010 flow of 8.2 cfs when calculating limits for the company's NPDES permit for the treatment facility. We believe that this figure should be used in place of the one in the RI, unless standard methods are employed to construct a historical hydrograph for the basin.

Similarly, calculations of Thornton Spring's contribution to Spring Creek using five flows in February 1991 and one flow from August 1991 is hardly adequate. Appendix J contains a page very similar to Appendix D of the Toxicological Study. After a discussion of the calculation of the contribution of Thornton Spring to Spring Creek, Appendix D of the study contains the statement "Additional data would be needed to accurately assess the relative flow of Thornton Spring and Spring Creek over the year." This Appendix D (of the Toxicological Study) appears to have been retyped and inserted into Appendix J of the RI, except the last sentence was omitted. We do not believe that one additional flow measurement in August 1991 constitutes sufficient "additional data" to characterize the stream and spring flows.

11. **Sections 4.6, Freshwater Drainage Ditch; 4.7, Thornton Spring; and 4.8, Spring Creek** - Future documents should include a single figure displaying all sediment data for both Phase I and II results for mirex, kepone, total volatiles and physical parameters. It would be helpful if a figure were included to show the gradient of contamination through the system (e.g., series of plots contrasting analytical results according to sampling stations).

While it is recognized that analytical procedures for pesticides are difficult, The RI should acknowledge when the levels of detection used in any specific sampling effort are above toxicity thresholds presented in Appendix K.

12. **Section 4.7.1 -Thornton Spring water** -- This site has the highest surface water concentration of VOCs in the study, almost 3 mg/L. Since this is below the level at which these chemicals would be acutely toxic, the concentrations correspond with the results of the aqueous-phase toxicity testing (no acute, but chronic toxicity). The water sample for that test, however, was not taken at the spring, but at the mouth of Thornton Branch, and was not analyzed for VOCs. Sampling throughout Thornton Spring has revealed VOC concentrations ranging from 0.8 to 3.0 mg/L. Figure 1-9 shows "monthly averages" at the spring ranging from less than 1 to 26 mg/L. The latter is certainly in the range of

concentrations that can cause acute toxicity. Variation within a month is also an unknown variable. This again points out the need for better characterization of flow at Thornton Spring and its relationship to contaminant flux in order to gauge possible contributions to Spring Creek.

We note that the concentration of kepone found in Thornton Spring water (0.939 ug/L) is far greater than the lowest concentrations listed for acute toxicity to aquatic organisms listed in the Baseline Risk Assessment (p. 185).

13. **Section 4.8.2., Spring Creek Sediment, page 4-56** - Inorganic sediment results are compared to soil background and published range values. Sediment sample values should only be compared to sediment background or to literature sediment values. Evaluation of remediation alternatives for the sediment pathway should take into account appropriate sediment background values. (For example, literature citation is NOAA technical memorandum NOS OMA52, E. R. Long and L. G. Morgan, The Potential for Biological Effects of Sediment-...).

14. **Section 7.2, Recommended Remedial Action Objectives** - In addition to the stated objectives, remedial activities should be designed to minimize any physical impact to the Creek stream habitat and to restore any impacted habitat as a result of remedial activities (e.g., replanting of stream-side vegetation to provide shading of surface water).

15. **Appendix K, Page 145, fourth line** - The text reads, "Mirex, for which a cancer slope factor was recently adopted by EPA..." This isn't true yet. It should be changed to "was recently proposed to EPA".

16. **Appendix K, Page 174** - See comment #2 above concerning RMU4.

17. **Appendix K, Page 145, fourth line** - The text reads, "Mirex, for which a cancer slope factor was recently adopted by EPA..." This isn't true. It should be changed to "was recently proposed to EPA".

18. **Appendix K, Table 24** - In checking Environ's risk calculations, the following problems were identified:

1. The concentrations for 1,2-dichlorobenzene and ethylbenzene in Table 24 of the risk assessment conflict with data in Table 4-10 of the RI. This discrepancy should be resolved.

2. In the appendix table containing risk estimates for episodic and daily workers, the hazard quotients (except those for carbon disulfide and TCE) are ten times too low. Since the cancer risks and two of the hazard quotients are correct, this discrepancy is puzzling. These calculations should be checked and revised as needed.